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ONC 3848

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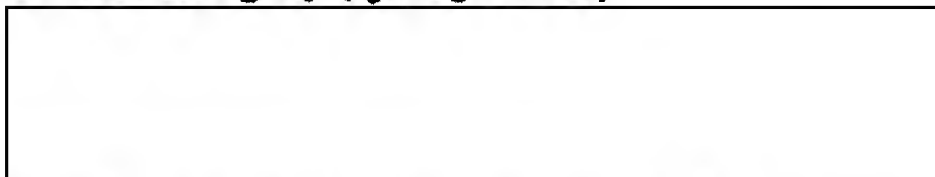
MEMORANDUM FOR: Acting Assistant Director, OSA

SUBJECT : Emergency Heading Device

1. The operational requirement for an emergency heading device in the OGCARF vehicle was thoroughly discussed and developed during a meeting 9 August 1962 at Project Headquarters. The purpose of this paper is to summarize the results of this investigation and to formalize the operational requirement.

2. The participants of the meeting mentioned above included:

Mr. John Parangosky (opening remarks)



This meeting culminated several months' investigation into this subject during which the following actions transpired:

- a. Initial development coordination between [redacted] and Lockheed.
- b. [redacted] Commander requested assistance from Acting Director, OSA with regard to development of a suitable device.
- c. [redacted] was requested to conduct an informal inquiry into the subject.

3. The essential elements to recognize in this problem include the following:

- a. The normal navigation heading devices include radio aids, the INS and the MA-1 compass (magnetic or gyro mode). The possibility of system failure of each unit does exist, however the "design redundancy" should allow sufficient backup.
- b. Lockheed established the point however, that the remote possibility exists that electrical failure is possible to the extent that all normal navigation references could be lost (alternator failure). Under this condition aircraft operation is still possible, however heading reference must be obtained from an emergency source.

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c. In the event of IRS failure, the MA-1 compass is available for an emergency heading reference. If the failure occurs in areas other than Polar regions, the magnetic mode can be utilized directly. However, the unslaved or gyro mode will have to be utilized in Polar regions which presents several problems, one of which is the necessity of rather frequent heading checks to ascertain gyro drift and correct if necessary for Coriolis effects. In this instance an emergency heading device will be required.

d. The backup Emergency Heading Device should include the following operational considerations:

- (1) Be independent of aircraft malfunctions.
- (2) Be extremely simple to use by a pilot under emergency operational conditions.
- (3) Furnish a heading reference under daylight and/or darkness conditions to within a tolerance of plus or minus 3 degrees.
- (4) Product development should be completed prior to 1 January, 1963.

4. The following recommended solution is based on the committee review of the [ ] proposal (which discussed five separate solutions), attachment #1. The "Celestial Saucer" solution was selected as the best answer to the overall problem since its heading reference is available under all conditions of daylight, twilight, and darkness. Both celestial observations and polarization of twilight principles are included.

Both the [ ] and Lockheed representatives felt that the device could be delivered in the required time and that the necessary aircraft installation problems could be satisfactorily resolved. The [ ] Staff Navigator concurred in the decision and indicated that this device will solve the problem. (Attachment #2 delineates the necessary tasks involved in the development of the device)

5. Your concurrence is requested to allow the Development Division to initiate actions necessary for the development, testing, and procurement of the [ ] "Celestial Saucer" emergency heading device.

SIGNED

[ ]  
Lt Colonel, USAF  
Chief, Operations Division, OSA

[ ]  
JAMES A. CUNNINGHAM, JR.  
Acting Assistant Director  
(Special Activities)

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Attachments - 2

1. [ ] Corporation Proposal
2. Celestial Saucer Development Tasks

OSA/OD/[ ] rh (13Aug62)

Distribution:

- #1 - OSA/C/OD (w/att)
- #2 - AAD/OSA (w/att 1)
- #3 - OSA/C/DD (w/att 1)
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